

#4

Testimony to the New Jersey State Board of Education
Joseph G. Rosenstein

September 17, 2008

Good afternoon.

My name is Joseph Rosenstein, and this month I began my 40th year as a professor of mathematics at Rutgers – New Brunswick. In my first 20 years, my focus was on mathematical research; in the past 20 years my efforts have been devoted to improving mathematics education in New Jersey.

I was very involved in developing the mathematics standards in 2002 and the initial version of the standards in 1996, and was responsible for getting a grant from the United States Department of Education which led to the development and publication of the New Jersey Mathematics Curriculum Framework in 1996.

As you may be aware, after the High School Redesign Committee issued its report in April, I wrote an article that the The Star Ledger published – I've attached it to this testimony – with the title "Algebra II + all high schoolers = overkill." That was not my title, but it was a fair summary of the article.

I sent all members of the Board of Education a copy of the article shortly after it appeared and, since I'm sure that you all remember the article, you might be thinking, "This guy has already said his piece, what is he doing here again?"

I'm here again because I'm disappointed that "Algebra II for All" is imbedded in the document that the NJ DOE presented to you today. Requiring all students to take Algebra II simply makes no sense, and those of us who know what Algebra II is, know that it makes no sense.

The reason that the Algebra II requirement appears in this document is because a few important people in the state believe that Achieve knows something about mathematics. It doesn't. Its claims are unsubstantiated. It is a political, not an educational organization.

Please don't accept Achieve's claim that employers want all students to learn Algebra II. Over the years, I have asked many employers what specifically they want their employees to know – not the courses they should take, but the skills they should master – and the answer is that they want them to both use and understand arithmetic and elementary algebra.

The topics of Algebra II are suitable only for those who will continue to calculus; topics like complex numbers, rational exponents, systems of linear inequalities, and inverse functions – all topics in Achieve's Algebra II course – are not needed by all students. When was the last time you needed to factor trinomials?

Moreover, there is no evidence to suggest that taking Algebra II will improve students' understanding of Algebra I.

Please don't accept Achieve's claim that everyone agrees that all students need the same mathematical skills that college-bound students need. They don't.

What we need for students who are going into the workforce is not more algebra but better algebra.

- It is algebra that focuses on solving the kinds of problems that arise in everyday situations.
- It is algebra that is related to what students are learning in their other courses and interests, ranging from sports to civics to vocations.
- It is algebra that enables students to make sense of data presented in the press and enables them to understand why buying lottery tickets is not the best investment.

What our students need is not more algebra but better algebra.

Working against the goal of better algebra is the current fashion of having more students take Algebra I in the 8th grade. That is another mistake, because many of the middle school teachers do not have a strong enough background to provide the better algebra that the students need.

What our students need is not early algebra but better algebra.

We can provide them with better algebra.

- We can better specify the skills and understandings that all students need to have and the kinds of problems all students need to be able to solve.
- We can provide teachers with targeted professional development that will help them better address these skills, understandings, and problem-solving in their classrooms.
- We can set proficiency levels on our state assessments that ensure that any student who is labeled "proficient" really is proficient – ready for the workplace and ready to take college-level courses.

Please don't accept the word of Achieve that requiring Algebra II will increase the number of students in the math/science pipeline. Rutgers is populated with students all of whom took Algebra II in high school, because we require it, but only a relatively small percentage of them are looking to careers in math and the sciences.

We need to encourage more of our students who are already taking advanced mathematics and science to pursue careers in these areas. We also have to make it possible for students who don't have access to good math and science education to enter the pipeline. But we shouldn't push all students into Algebra II.

Please don't accept the word of Achieve that students who take Algebra II are more likely to succeed in college because they took Algebra II in high school.

That's bad reasoning, the kind of reasoning we want all students to learn to reject – just because A is correlated with B, that doesn't mean that A causes B. My beard is 43 years old, but growing a beard did not cause me to become a professor.

Am I against Algebra II? Not at all. It's great stuff. It's essential for anyone who is going to college and wants to keep options open, because many college majors require calculus. However, Algebra II is not essential for all high school students.

Should we have high expectations for our students? Absolutely.

Should we raise expectations for all of our students? Absolutely.

Should we expect all students to take elementary algebra and geometry? Absolutely.

Should we require all students to take challenging and useful mathematics? Absolutely.

Should we require all students to take four years of mathematics? Absolutely.

Should we encourage more students, particularly those from economically distressed backgrounds, to succeed in mathematics? Absolutely.

Enabling students from all backgrounds to achieve high standards, enabling all students to understand and use mathematics, enabling all students to see the value of mathematics in today's world, should be our goal.

That won't be achieved by requiring all students to take Algebra II.

So I encourage you to reject the Algebra II requirement for all students.

Thank you for your attention.

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